CLAIMS

1. An arrangement (10) for cooling a component, in particular an electronic component,

which arrangement comprises:

a pump (24) for pumping a coolant (52), which pump (24) comprises a pump rotor (84);

a fan (30) that comprises a fan rotor (78) associated with which is an electric motor (76) to drive it,

the pump rotor (84) and the fan rotor (78) being separated from one another in fluid-tight fashion and drivingly connected to one another via a magnetic coupling (80, 84).

2. The arrangement according to claim 1,

the magnetic coupling (80, 84) comprising a magnet cup (80) that is connected to the fan rotor (78),

the pump rotor (84) being made at least partly of a magnetic material; and

the magnet cup (80) being arranged relative to the pump rotor (84) in such a way that a rotation of the magnet cup (80) causes, via the magnetic coupling, a rotation of the pump rotor (84).

3. The arrangement according to claim 2,

the pump rotor (84) being produced from a material, in particular plastic, in which material are embedded magnetized magnet particles or segments.

4. The arrangement according to any of the preceding claims,

the pump rotor (84) comprising a plurality of pump vanes (86) for generating a flow of the coolant (52).

5. The arrangement according to claim 4,

the pump vanes (86) being implemented integrally with the pump rotor (84).

6. The arrangement according to any of the preceding claims,

the fan (30) comprising a fan housing (71) and the pump (24) comprising a pump housing (82); and

having a pump retaining member (72) that connects the fan housing (71) to the pump housing (82).

7. The arrangement according to claim 6,

the fan housing (71) and the pump retaining member (72) being implemented integrally.

8. The arrangement according to any of the preceding claims,

which comprises a heat exchanger (28) for cooling the coolant (52), which exchanger is located in an air flow region of the fan (30) and is in fluid communication with the pump (24) for the coolant (52).

9. The arrangement according to claim 8,

the heat exchanger (28) being implemented as a flat-tube heat exchanger.

10. The arrangement according to claim 8 or 9,

the heat exchanger (28) comprising a plurality of plates (96) for the passage of air.

11. The arrangement according to claim 10,

the plates (96) comprising a plurality of shutters (130, 135) for improving the absorption of heat by the air passing through.

12. The arrangement according to any of claims 8 through 11,

the heat exchanger (28) comprising a heat exchanger housing (88) and the fan (30) comprising a fan housing (71); and

the heat exchanger housing (88) and fan housing (71) being implemented integrally.

13. The arrangement according to claim 12,

which comprises a pump retaining member (72) that connects the fan housing (71) to the pump (24),

the heat exchanger housing (88), the fan housing (71), and the pump retaining member (72) being implemented integrally.

14. The arrangement according to any of the preceding claims,

which comprises a heat absorber (20) for cooling a component,

which heat absorber (20) is in fluid communication both with the pump (24) and with the heat exchanger (28) and forms with them a coolant circuit.

15. The arrangement according to claim 14,

the heat absorber (20) being implemented as a flat-tube heat absorber.

16. The arrangement according to claim 15,

the heat absorber (20) comprising a heat absorption element (64) that is manufactured from copper or aluminum.

17. The arrangement according to any of claims 14 through 16,

the heat absorber (20) comprising external cooling fins.

18. The arrangement according to any of claims 14 through 17,

an additional fan being associated with the heat absorber (20) for cooling.

19. The arrangement according to any of claims 14 through 18, comprising a component (12) to be cooled,

a heat transfer improvement medium, in particular a thermally conductive foil and/or a thermally conductive paste, being arranged between the heat absorber (20) and the component (12) to be cooled.

20. The arrangement according to any of the preceding claims,

a rotation speed controller (122) being associated with the electric motor (76).

21. The arrangement according to claim 20,

which comprises a temperature sensor (120) that is connected to the rotation speed controller (122) in order to control a temperature-dependent rotation speed.

22. The arrangement according to claim 21,

the temperature sensor (120) being an NTC resistor.

23. The arrangement according to claim 21 or 22,

the temperature sensor (120) being arranged in the region of the heat absorber (20).

24. The arrangement according to any of claims 21 through 23,

the temperature sensor (120) being arranged in the region of a component (12) to be cooled.

25. The arrangement according to any of claims 21 through 24,

the temperature sensor (120) being arranged at least partly in the coolant circuit.

26. The arrangement according to any of the preceding claims,

the fan (30) being implemented as a radial fan.

27. The arrangement according to any of the preceding claims,

the fan (30) and the pump (24) being connected detachably to one another.

28. The arrangement according to claim 27,

the fan (30) and the pump (24) being connected to one another via a screw connection and/or a quick-release coupling.

29. The arrangement according to any of the preceding claims,

metal hoses and/or metal tubes being provided for fluid communication.

30. The arrangement according to any of the preceding claims,

the fan (30) comprising a fluid conduit (100) for conveying a coolant (52) therethrough.

31. The arrangement according to claim 30,

wherein the fan (30) comprises a fan housing (71), and the fluid conduit (100) is implemented in the fan housing (71).

32. The arrangement according to claim 31,

wherein the fan housing (71) comprises cooling fins.

33. The arrangement according to claim 31 or 32,

wherein the fan housing (71) is implemented from a thermally conductive plastic.

34. The arrangement according to any of claims 30 through 33,

wherein the fan (30) comprises a stator (76) having electrical components, the fluid conduit (100) being routed past the electrical components of the stator (76) for cooling.

35. A method for cooling a component,

using a fan (30) that comprises a fan rotor (78) and a drive motor (76),

using a pump (24) that comprises a pump rotor (84),

using a coolant (52) that is pumpable by means of the pump (24),

using a magnetic coupling (80, 84) that drivingly connects the fan rotor (78) and the pump rotor (84),

comprising the following steps:

A) the fan rotor (78) has a rotational motion imparted to it by means of the drive motor (76);

B) the pump rotor (84) has a rotational motion imparted to it, via the magnetic coupling (80, 84), by means of the rotational motion of the fan rotor (78);

C) the coolant (52) is caused to flow by the rotational motion of the pump (84).

36. The method according to claim 35,

using a heat exchanger (28) to cool the coolant, which exchanger is in fluid communication with the pump (24),

which method additionally comprises the following steps:

A2) air is caused to flow by the rotational motion of the fan rotor (78);

C2) the coolant (52) is pumped through the heat exchanger (28) by the pump (24);

C3) the coolant is cooled by the flow of heat from the coolant

(52) to the air that has been caused to flow.

37. The method according to claim 36,

using a heat absorber (20) to cool a component, which exchanger is in fluid communication with the pump (24) and the heat exchanger (28),

which method additionally comprises the following step:

C4) the coolant (52) is pumped through the heat absorber (20) by the pump (24).

38. The method according to claim 37,

the pump (24), the heat exchanger (28), and heat absorber (20) forming a coolant circuit,

which method additionally comprises the following step:

C5) the coolant is pumped through the coolant circuit in the sequence: pump (24), heat exchanger (28), heat absorber (20), pump (24).

39. The method according to claim 38,

the pump (24), the heat exchanger (28), and the heat absorber (20) forming a coolant circuit,

which method additionally comprises the following step:

C6) the coolant (52) is pumped through the coolant circuit in the sequence: pump (24), heat absorber (20), heat exchanger (28), pump (24).

40. The method according to any of claims 36 through 39,

using a housing, in particular a computer housing, in which the heat exchanger is located,

which method additionally comprises the following step:

A3) the air heated by the heat exchanger (28) is discharged directly from the housing.

41. The method according to claim 40,

which method additionally comprises the following step:

A4) the air flowing into the housing as a result of the rotational motion of the fan rotor (78) is directed over further components located in the housing, in particular graphics cards, chip sets, hard drives, and power supplies.

42. The method according to any of claims 35 through 41,

the drive motor (76) comprising a rotation speed controller,

using a temperature sensor that generates a sensor signal,

which method additionally comprises the following steps:

A5) the sensor signal is allocated to a target rotation speed value;

A6) the rotation speed of the drive motor (76) is regulated to the target rotation speed value by the rotation speed controller.